

pH CONTROL OF SAUCES USED ON ACIDIFIED PASTA OR RICE

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BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to sauces and, specifically, to sauces which are used on, or in combination with, pasta or rice that has been acidified to a pH of 3.7 to 4.5 for preservation purposes.

2. Description of the Related Art

In U.S. Patent 5,759,607 is described a process for acidifying pasta or rice in order to extend the shelf life of such pasta or rice. However, when the pasta or rice is typically acidified to a pH of 3.7 to 4.5 for preservation purposes, such pasta or rice provides an objectionable, uncharacteristic flavor, especially when used in combination with sauces that typically have no acidic flavor. In U.S. Patent 4,568,555, is described a process of making a typical cheese sauce. When mixing a typical cheese sauce with acidified pasta/rice, the acidic notes of the pasta/rice results in an uncharacteristic taste to the meal. The disclosure of the foregoing patents is herein incorporated in its entirety by reference.

OBJECTS AND SUMMARY OF THE INVENTION

It is an object of the invention to provide a shelf stable pasta or rice product having a pH on the order of about 3.7 to about 4.5 for preservation purposes, which has no objectionable, uncharacteristic flavor when used in combination with sauces that typically have no acidic flavor.

It is a further object of the invention to provide sauces for pasta and rice having a pH higher than the acidified pasta and rice to which they are mixed or used in combination to provide a typical, pleasant flavor profile that was more preferred by tasters.

It is a further object of the invention to provide a two part packaged product in which the first part comprises an acidified pasta or rice product and the second part comprises a sauce which has a higher pH than the pasta or rice. The invention also concerns a method for producing ready to eat pasta or rice products, which are obtained by mixing a sauce and a pasta or rice (with or without heating) to produce a more typical, pleasant flavor profile that is more preferred by tasters. Acidic flavor notes that could be detected by mixing an acidified pasta or rice with a regular sauce are muted or were not present in a pH adjusted sauce. These and other objects of the invention will be apparent from reading the following description of the preferred embodiments.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In U.S. Patent 5,759,607, acidified pasta or rice was prepared so as to provide storage stability for the cooked product. Typically, the pasta or rice is acidified to a pH of about 3.7 to about 4.5 for preservation purposes. However, such pasta or rice provides an objectionable, uncharacteristic flavor when used in combination with sauces that typically have no acidic flavor. Thus, a more desirable overall flavor of the pasta or rice dish can be achieved when the normal pH of a typical sauce is raised to a higher level by the addition of a substance, such as an edible alkaline or base substance.

This was demonstrated with the combination of a cheese sauce and acidified pasta, wherein the cheese sauce having a normal pH of about 5.3 to about 6.0, preferably about 5.5 to about 5.9 was raised to a pH between about 6.2 to about 7.2. Even though the acidified pasta to which the modified cheese sauce was added had a normal pH in the range of about 3.7 to about 4.5, the combined pasta and sauce had a more typical pleasant flavor profile that was more preferred by tasters. Acidic flavor notes that were detected with the regular sauce on the pasta were not present when the pH adjusted sauce was mixed with the pasta. We have found that the results of the

invention can be achieved if the pH of the sauce is raised to an uncharacteristically higher level by at least a fraction of a pH unit. We have found suitable results by raising a sauce having a pH of 5.5 to 5.9. The following examples are illustrative of the invention but are not to be construed as limiting the invention:

Example 1

Cheese sauce ingredients are blended and the pH is taken. The natural pH of 5.9 is raised to as high as 7.2 pH using 1 M disodium phosphate solution, 50 ml of 1 M disodium phosphate duohydrate and 13.9 ml of 0.1 M NaOH, and 2 N NaOH. The sauce is otherwise processed according to the methodology normal for that particular sauce. The sauce, thus processed, is hermetically packaged to provide a shelf-stable product. This sauce is ultimately mixed with an acidified pasta dish having a pH in the range of about 3.7 to about 4.5.

Example 2

White sauce that is successfully marketed for use with freshly cooked conventional pasta normally has a pH of 5.4 to 5.6. Pasta used is typically dry pasta that has been cooked in boiling water for 10 minutes or until a desirable texture is achieved. The resulting pasta is close to a pH of 6.8 to 7.0. Freshly extruded pasta or pasta that has been not fully dried can also be used. When fully cooked and hydrated these pastas will also have a pH close to 6.8 to 7.0. When used with commercial sauces the combination has a pleasant flavor that can be characterized as Alfredo, Garlic Alfredo or a flavored variety. Examples of such sauces are Classico Alfredo Sauce, Five Brothers Alfredo Sauce or Ragu Alfredo Sauce. All are made with a retorted sauce. Similar sauces could be made as refrigerated or frozen sauces. When these sauces are combined with an acidified pasta such as that made under U.S. Patent 5,795,607, the combination of sauce and acidified pasta have an unpleasant acidic aftertaste, uncharacteristic of that made with conventional pasta. In this invention,

a sauce is made with an uncharacteristically higher pH to provide a balanced flavor similar to that of the combination of conventional pasta and conventional sauce. The sauce is prepared by the following method:

| | |
|--------------------|--|
| Fresh Cream | 15.0% (10.0 - 30.0%) |
| Soybean Oil | 5.0% (0.0 - 100%) |
| Cheese | 7.0% (2.0 - 20.0%) |
| Butter | 2.5% (0.0 - 5.0%) |
| Emulsifier | 3.0% (2.5 - 3.5%) |
| Disodium Phosphate | 0.75% (Quantity to adjust pH to desired level approximately 0.7% - 1.0%) |
| Starch | 2.2% (Quantity to adjust viscosity to desired level approximately 2.0 - 2.5%) |
| Xanthan Gum | 0.1% |
| Flavors | 4.55% (sugar, cheese flavor, butter flavor, salt, garlic, pepper, spices and seasonings) |
| Water | 60.0% |

Water Phase

1. Add starch into water and mix 3 minutes
2. Add dry ingredient blend (sugar, salt, disodium phosphate, garlic, pepper, dry seasoning ingredients, gum) and mix 5 minutes
3. Add emulsifier and mix 5 minutes
4. Heat to 175°F and hold 5 minutes

Fat Phase

1. Mix cream with liquid cheese flavors and butter heating to 130°F
2. Combine fresh cheese, with remaining dry flavors
3. Heat to 180°F and hold 5 minutes until cheese is melted
4. Homogenize slurry at 2700 psi (2200-2500 psi first stage, 400-500 psi second stage)
5. Mix water phase with fat phase and heat to 175°F for 5 minutes
6. Homogenize combined phases at 500 psi

7. Heat in a heat exchanger (No-Bac HEX) to 292°F for 3.5 seconds an Fo of 6 (or conditions sufficient to achieve commercial sterility)
8. Cool to 90-100°F
9. Fill aseptically

This product will have pH of 6.2 - 6.3 that makes this sauce complement acidified pasta to provide a familiar, please flavor.

This formulation can also be prepared using a retort process. In that case step 7 under “Fat Phase” would be changed to:

7. Fill containers (in this case retortable pouches) with product, place in a retort (Stock Pilot Rotor 900) and thermally process to achieve a temperature of 250°F for 10 minutes to achieve an Fo of 6 (or conditions sufficient to achieve commercial sterility)
8. Cool to 90-100°F

Example 3

Cheese sauce that is successfully marketed for use with freshly cooked conventional pasta normally has a pH of 5.4 to 5.6. Pasta used is typically dry pasta that has been cooked in boiling water for 10 minutes or until a desirable texture is achieved. The resulting pasta is close to a pH of 6.8 to 7.0. Freshly extruded pasta or pasta that has been not fully dried can also be used. When fully cooked and hydrated, these pastas will also have a pH close to 6.8 to 7.0. When used with commercial sauces, the combination has a pleasant flavor that can be characterized as Cheese, Cheddar Cheese or a flavored variety. Examples of such sauces are Kraft Macaroni and Cheese, Kraft Velveeta Shells and Cheese. Sauces are typically made from a dry blend of cheese and cheese flavors or a shelf stable cheese sauce that is formulated to be stable to microbial growth by

controlling the amount of water, the pH and amount of phosphates, work based on that of Tanaka *Journal of Food Protection*, Vol. 49, No. 7, pages 526-531 (July 1986), the entire disclosure of which is herein incorporated by reference. Typically, these sauces are in the pH range of 5.3 to 5.5. Similar sauces could be made as refrigerated or frozen sauces. When these sauces are combined with an acidified pasta such as that made under U.S. Patent 5,795,607, the combination of sauces and acidified pasta have an unpleasant acidic aftertaste, uncharacteristic of that made with conventional pasta. In this invention, a sauce is made with an uncharacteristically higher pH to provide a balanced flavor similar to that of the combination of conventional pasta and conventional sauce. By elevating the pH to 5.7 to 6.0, a more desirable flavor is achieved when the sauce is combined with acidified pasta.

Example 3

An alternative approach to the sauces with adjusted pH in "Example 3" is a cheese sauce that is produced aseptically. An example of this cheese sauce was made with the following methodology:

| | |
|---------------------------------------|---|
| Cheddar Cheese | 19.01% (10.0 - 30.0%) |
| Processed Cheese | 6.86% (0.0 - 10.0%) |
| Cheese Powder | 4.62% (2.0 - 20.0%) |
| Butter Powder | 2.77% (0.0 - 5.0%) |
| Soy Lecithin | 0.046% (2.5 - 3.5%) |
| Partially Hydrogenated Soybean Oil | 1.85% (0 - 5%) |
| Disodium Phosphate Duohydrate | 1.54% (Quantity to adjust pH to desired level approximately 0.7% - 1.0%) |
| Starch | 1.99% (Quantity to adjust viscosity to desired level approximately 2.0 - 2.5%) |
| Sodium Alginate | 0.46% |
| Flavors | 3.7% (sugar, cheese flavor, salt) |
| Water | 57.154% |

1. Dry blend starch, alginate and phosphate
2. Add water to Waring blender
3. Using high speed, add the dry blend and mix for 2 minutes
4. Add Cheeses, Cheese powder, butter powder
5. Add oil and lecithin, blend until well mixed
6. Heat to 120°F
7. Add buffer solution to achieve desired pH of 6.3 (buffer solution 142 grams of Disodium Phosphate per 1000 grams of water)
8. Process slurry on aseptic system running at 25 gallons/minute (1st heater to 140°F, 2nd heater to 180°F, holding at time 292°F)
9. Cool to 130°F
10. Package material and refrigerate or fill aseptically

In a particularly preferred embodiment, acidified pasta or rice is prepared as described in U.S. Patent 5,759,607, the entire disclosure of which is herein incorporated by reference. Such acidified pasta or rice is hermetically sealed, preferably under an inert gas, in a container such as a pouch or serving tray. The hermetically packaged sauce is included in the container or, alternatively, sold in combination with, the acidified pasta or rice, such that the combination of the modified sauce and acidified pasta/rice will result in a more pleasant flavor profile when the sauce is mixed with the pasta/rice.

The combination of pasta or rice and sauce according to the invention can easily be produced and is very convenient for consumers. No additional step of adding or mixing a neutralizing agent to the acidified pasta is needed and, thus, the food preparation is simpler and more typical of a preparation with which the consumer is familiar. The acidified product mixed with the pH adjusted

sauce has a more typical, pleasant flavor profile that was much preferred by tasters. Acidic flavor notes that were detected with the regular sauce were not present with the pH adjusted sauce.

Typical sauces which are usable in the invention include:

Brown Sauce

Bordelaise

Mushroom Brown Sauce

White Sauce

Alfredo Sauce

Curry Sauce

Dill Sauce

Horseradish Sauce

Veloute Sauce

Hollandaise Sauce

Bearnaise Sauce

Mornay Sauce

Raisin Sauce

Cream Gravy

Giblet Gravy

Tomato Sauce

The pH range of these sauces is typically about 4.5 to about 7.0 in their natural state, but the pH can be raised as in the Examples above in order to neutralize the flavor of the acidified pasta or rice.

1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725 2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738 2739 2740 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752 2753 2754 2755 2756 2757 2758 2759 2760 2761 2762 2763 2764 2765 2766 2767 2768 2769 2770 2771 2772 2773 2774 2775 2776 2777 2778 2779 2780 2781 2782 2783 2784 2785 2786 2787 2788 2789 2790 2791 2792 2793 2794 2795 2796 2